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Fabrication Techniques for Organic Electrolyte Battery

A report describing the fabrication and testing of silver chloride electrodes for use in organic electrolyte batteries discusses the experimental procedures used, the test results and the development of parameter ranges used for fabricating electrodes. The experiments were part of a research effort to develop a battery capable of producing fifty watt-hours of energy per pound of battery weight and operable over a temperature range of -54°C to 121°C .

Electrodes were fabricated from silver chloride by pelletizing, sintering, hot press binding and paste binding silver chloride on expanded metal grids of nickel or silver. Each technique was investigated by a statistically designed factorial experiment. The factors considered were parameters associated with the composition and preparation of the electrode and included pressure, temperature, binder type and filler type.

The electrodes were tested in a test cell which used a silver-silver chloride reference electrode. Both half cell and full cell tests were conducted. Electrolytes of phenyltrimethylammonium hexafluorophosphate or morpholinium hexafluorophosphate were used. The tests conducted included a galvanostatic transient test to determine electrode resistance and concentration polarization, transfer function measurement to determine electroactive surface areas and a cell discharge test.

The result of the research shows that the internal resistance of the test cell is low and caused by diffusion limitations. Good coulombic efficiencies (75%) can be obtained at room temperatures and the cell continues to operate at low temperatures. The report contains valuable information on pelletized electrodes and a basis is established for future experiments because parameter ranges which can be used to construct mechanically sound electrodes are presented.

Notes:

1. The following documentation may be obtained from:
National Technical Information Service
Springfield, Virginia 22151
Single document price: \$3.00
(or microfiche \$0.95)

Reference: SC-CR-69-3290, Organic Electrolyte Battery (Final Report)
2. Technical questions may be directed to:
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Patent status:

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